

amount of constriction. The general outline of the muzzle, instead of being acute and subcuneiform, is obtuse and oblong, somewhat resembling the form of *C. palustris* of the Ganges. There is also a marked constriction behind the twelfth tooth, considerably greater than in *C. vulgaris*. The largest teeth are the third, the fourth, and the tenth, the last being the largest of all. The nasal aperture is more circular than in *C. vulgaris*. There is no lower jaw to the Belfast specimen. Plate VII. figs. 1, 2 and 3 represent the cranium, viewed from the top, side and palate, as in *C. cataphractus*.

The dimensions of the cranium are as follow:—

DIMENSIONS.	<i>C. cataphractus.</i>	<i>C. marginatus.</i>
	inches.	inches.
Length of cranium from the point of the muzzle to the occipital ridge	15·5	16
Length of cranium from the point of the muzzle measured to the condyle of the upper jaw		
Extreme width of cranium at the condyles	7	8·5
Length from occipital ridge to base of nasals	6	6·7
Length from the point of the muzzle to base of nasals	9	10·7
Length of orbit		
Width of orbit	1·8	2·7
Interval between orbits	1·4	2
Antero-posterior diameter of crotaphite foramen ...	·8	1·5
Transverse diameter of crotaphite foramen	1·1	1·9
Width of the muzzle at the last tooth	·8	1·4
Width of the muzzle at base of the nasals.....	6·7	6·5
Width at contraction behind the twelfth tooth	2·8	4·8
Width at the tenth tooth.....		6·8
Width at the ninth tooth.....	2	
Width at contraction behind the fourth tooth	1·1	
Greatest contraction behind fifth tooth		2·9
Dilatation of the point of the muzzle	1·8	4·3
Length of the nasal aperture	·9	2
Width of the nasal aperture	·75	1·8
Length of intermaxillaries on the palate	3	3·9
Length of maxillaries on the palate	6·3	4·1
Antero-posterior diameter of palatine foramen.....		4·7
Transverse diameter of palatine foramen		1·9

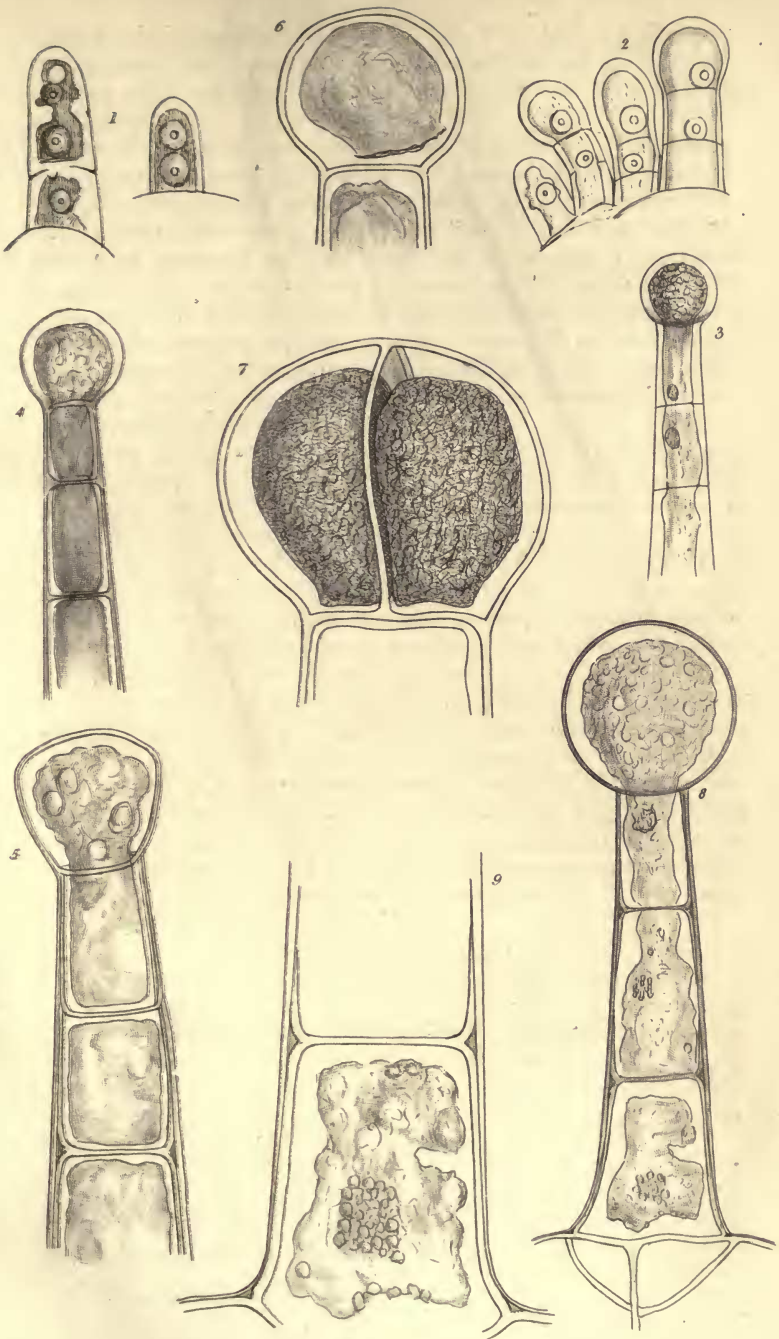
XXXIX.—On the Development of Vegetable Cells.

By ARTHUR HENFREY, F.L.S.*

[With a Plate.]

IN some observations which I had the honour to lay before this Section at Cambridge last year, I brought forward certain views I had adopted in regard to the multiplication of vegetable cells by division, which I then stated to be to a certain extent hypothetical,

* Read before the British Association, Southampton, Sept. 1846, and communicated by the Author.





that is to say, they were rather the only probable explanation of the phænomena I had observed, than conclusions from an unbroken series of examinations of the process in its successive stages.

I then gave it as my opinion, that the division of the parent-cell into new cells is effected by the gradual folding inward of the primordial utricle, which organ, in virtue of its peculiar function, secretes the septum within that fold; the circular constriction thus produced arriving finally at the centre, the septum consisting of a double layer of cell-membrane becomes complete.

It is chiefly with the view of confirming and substantiating this opinion, and of supporting it by a reference to the evidence in its favour which has since been furnished by other and independent observers, that I have been induced to submit the present remarks to your consideration.

It may be remembered that I acknowledged last year that my investigations had been directed in the channel which led to the conclusions at which I had arrived by the elaborate observations on the primordial utricle published by its discoverer Prof. Mohl.

Toward the close of last year I was not a little gratified to find that the further researches he had instituted into the office of this structure had led him to adopt precisely the same view of the process of cell-division in certain plants which I had ventured to propound as of general occurrence.

In the memoir on the Structure of Vegetable Cells*, in which he first described the primordial utricle, Prof. Mohl stated that, in the *Confervæ*, this organ in cell-division became constricted by a septum growing inward from the walls which finally separated it into two; but at that time he thought it probable that this was a process totally different from that which took place in the *Phanerogamia*, where he believed that the primordial utricle separated into two before the production of the septum commenced.

In a paper on the division of the cells of *Confervæ*, published in 1835, before the discovery of the primordial utricle, Prof. Mohl affirmed that the septum grew inward directly from the cell-wall and thus divided the cell into two. In the collected edition of his memoirs published last year, he has re-written this latter paper, correcting it in several important particulars in consequence of a new series of observations he was induced to undertake to investigate the theory of cell-development advocated by Nägeli.

He there describes and figures the process of cell-division in *Conferva glomerata*, and shows the production of the septum by the primordial utricle exactly in the manner which I had indicated as occurring in the hairs of the stamens of *Tradescantia*.

* Translated in Taylor's Scientific Memoirs, Part XIII. p. 91.

M. Müller, in his researches upon the development of *Chara**, declares that cell-formation is effected by two different and apparently very distinct processes.

Some of the cells, he says, are produced from cytoblasts in the manner described by Schleiden, from whom, however, he differs in some respects, since he regards the membrane developed from the cytoblast as identical with Mohl's primordial utricle, and therefore not as the permanent cell-wall.

In other cells multiplication takes place by division, and the figures in which he represents the condition of the primordial utricle in various stages of its division, agree perfectly with the appearances observed by Prof. Mohl and myself.

With respect to the production of cells from cytoblasts, I do not think the evidence he has offered conclusive; one of his figures indeed, which he owns that he cannot explain, rather inclines me to believe, not that the cytoblasts are the efficient causes of the development of new cells, but that their presence in certain cases of multiplication of cells by division, has led Müller, like Schleiden and others, to a misconception of their function.

I will not venture an opinion as to the real function of the cytoblast, but this much I may state, that it is generally present at a very early period of cell-life, and usually of the full size. Now cell-division often takes place, or rather commences at an epoch when the cytoblast completely fills that portion of the primordial utricle which is about to form a new cell; on the subsequent expansion of the utricle its walls retreat from the periphery of the cytoblast or nucleus which then remains suspended in the cavity or attached to the wall. This may be observed in the moniliform hairs of *Tradescantia*.

It is evident that we have here an appearance simulating the development of membrane from a cytoblast as described by Schleiden; and since I have never been able to see the production of cytoblasts themselves by the aggregation of the granules of the mucilage, I think it most probable that it has been a misinterpretation of similar phænomena which has given rise to Schleiden's theory.

Müller has represented a cytoblast or nucleus cut into two portions by the fold of the primordial utricle.

The same division of the perfect nucleus by the septum of the cell has been observed by Unger. This is a different thing from the original division of the nuclei which is said to occur at the earliest epoch of the life of the cell, but it is direct evidence against the assumption that the cytoblast is the active agent in the production of the new membrane.

* See Ann. Nat. Hist. vol. xvii. p. 254, &c.